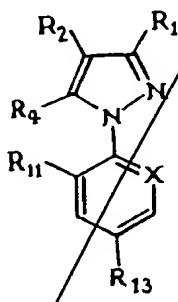
CLAIMS

1. Anti-flea and anti-tick collar or other external device for a pet, in particular a cat or dog, made of a matrix in which is incorporated from 0.1 to 40% by weight, relative to the collar, of a substance which is active against fleas and ticks, this active substance being formed of at least one compound corresponding to formula (I) below:



(I)

in which:

R_1 is CN or methyl or a halogen atom;

R_2 is $S(O)_nR_3$ or 4,5-dicyanoimidazol-2-yl or haloalkyl;

R_3 is alkyl or haloalkyl;

R_4 represents a hydrogen or halogen atom; or a radical NR_5R_6, $S(O)_mR_7$, $C(O)R_7$, $C(O)O-R_7$, alkyl, haloalkyl or OR_8 or a radical $-N=C(R_9)(R_{10})$;

R_5 and R_6 independently represent a hydrogen atom or an alkyl, haloalkyl, C(O)alkyl, alkoxycarbonyl or $S(O)_rCF_3$ radical; or R_5 and R_6 may together form a divalent alkylene radical which may be interrupted by one or two divalent hetero atoms, such as oxygen or sulphur;

R_7 represents an alkyl or haloalkyl radical;

R_8 represents an alkyl or haloalkyl radical or a hydrogen atom;

R_9 represents an alkyl radical or a hydrogen atom;

R_{10} represents a phenyl or heteroaryl group optionally substituted with one or more halogen atoms or groups such as OH, -O-alkyl, -S-alkyl, cyano or alkyl;

R_{11} and R_{12} represent, independently of each other, a hydrogen or halogen atom, or CN or NO_2;

R_{13} represents a halogen atom or a haloalkyl, haloalkoxy, $S(O)_qCF_3$ or SF_5 group;

m, n, q and r represent, independently of each other, an integer equal to 0, 1 or 2;

X represents a trivalent nitrogen atom or a radical $C-R_{12}$, the other three valency positions of the carbon atom forming part of the aromatic ring;

with the proviso that when R_1 is methyl, either R_3 is haloalkyl, R_4 is NH_2, R_{11} is Cl, R_{13} is CF_3 and X is N; or R_2 is 4,5-dicyanoimidazol-2-yl, R_4 is Cl, R_{11} is Cl, R_{13} is CF_3 and X is =C-Cl;

this collar or other external device being designed to ensure more than 6 months of efficacy against fleas and more than 3 months of efficacy against ticks, the efficacy preferably being maintained for several weeks even if the collar or other external device is taken off or lost or if there is a variation in the release of the compound (I) by the matrix.

2. Collar according to claim 1, characterized in that the compound of formula (I) is such that:

R_1 is CN or methyl;

R_2 is $S(O)_nR_3$;

R_3 is alkyl or haloalkyl;

R_4 represents a hydrogen or halogen atom; or a

radical NR_5R_6, $S(O)_mR_7$, $C(O)R_7$, alkyl, haloalkyl or OR_8 or a radical $-N=C(R_9)(R_{10})$;

R_5 and R_6 independently represent a hydrogen atom or an alkyl, haloalkyl, C(O)alkyl or $S(O)_rCF_3$ radical; or R_5 and R_6 may together form a divalent alkylene radical which may be interrupted by one or two divalent hetero atoms, such as oxygen or sulphur;

R_7 represents an alkyl or haloalkyl radical;

R_8 represents an alkyl or haloalkyl radical or a hydrogen atom;

R_9 represents an alkyl radical or a hydrogen atom;

R_{10} represents a phenyl or heteroaryl group optionally substituted with one or more halogen atoms or groups such as OH, -O-alkyl, -S-alkyl, cyano or alkyl;

R_{11} and R_{12} represent, independently of each other, a hydrogen or halogen atom;

R_{13} represents a halogen atom or a haloalkyl, haloalkoxy, $S(O)_qCF_3$ or SF_5 group;

m, n, q and r represent, independently of each other, an integer equal to 0, 1 or 2;

X represents a trivalent nitrogen atom or a radical $C-R_{12}$, the other three valency positions of the carbon atom forming part of the aromatic ring;

with the proviso that when R_1 is methyl, then R_3 is haloalkyl, R_4 is NH_2, R_{11} is Cl, R_{13} is CF_3 and X is N.

3. Collar according to claim 2, wherein the compound of formula (I) is such that R_1 is CN.

4. Collar according to claim 2, wherein the compound of formula (I) is such that R_{13} is haloalkyl.

5. Collar according to claim 4, wherein the compound of formula (I) is such that R_{13} is CF_3.

6. Collar according to claim 2, wherein the compound of formula (I) is such that R_2 is $S(O)_nR_3$.

7. Collar according to claim 6, wherein n = 1 and R_3 is chosen among the group consisting of CF_3, methyl, ethyl.

8. Collar according to claim 6, wherein n = 0 and R_3 is CF_3.

9. Collar according to claim 2, wherein the compound of formula (I) is such that X is $C-R_{12}$, R_{12} being a halogen atom.

10. Collar according to claim 2, wherein the compound of formula (I) is chosen from those in which R_1 is CN, R_3 is haloalkyl, R_4 is NH_2, R_{11} and R_{12} are, independently of each other, a halogen atom, and/or R_{13} is haloalkyl.

11. Collar according to claim 2, wherein the compound of formula (I) is chosen among the group consisting of compound A:

1-[2,6-$Cl_2$4-CF_3phenyl]3-CN4-[SO-CF_3]5-NH_2pyrazole

~~and its derivatives~~ with n=0 and R_3 is CF_3, and n=1 and R_3 is ethyl.

12. Collar according to claim 2, wherein the collar comprises from 1 to 15% active substance.

12. Collar according to claim 2, wherein the collar comprises from 1.25 to 10% active substance.

~~13.~~ ~~Collar~~ according to claim 1, wherein the collar comprises from 2 to 6% active substance.

~~14.~~ ~~Collar~~ according to claim 1, wherein the collar comprises from 2.5 to 5% active substance.

~~15.~~ ~~Collar~~ according to claim 11, wherein the collar comprises from 1.25 to 10% active substance.

16. Collar according to claim 11, wherein the collar comprises from 2 to 6% active substance.

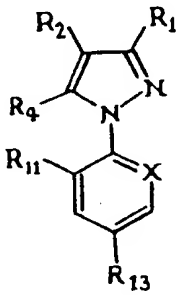
17. Collar according to claim 11, wherein the collar comprises from 2.5 to 5% active substance.

18. ~~Collar~~ The external device according to claim ~~11~~ 1, wherein the efficacy is maintained when the collar or external device is taken off or lost, over a period ranging from 2 to 3 months against fleas and from 1 to 2 months against ticks.

19. ~~Collar~~ The external device according to claim ~~11~~ 1, wherein it comprises a concentration of active substance which ensures effective protection against fleas for a period longer than or equal to 12 or 18 months.

20. ~~Collar~~ The external device according to claim ~~11~~ 1, wherein it comprises a concentration of active substance which ensures effective protection against ticks for a period longer than or equal to 12 or 15 months.

21. Method for eliminating fleas and ticks from pets, in particular cats and dogs, in which one attaches to the pets at least one collar or other external device which comprises a compound corresponding to formula (I) below:



(I)

in which:

R_1 is CN or methyl or a halogen atom;

R_2 is $S(O)_nR_3$ or 4,5-dicyanoimidazol-2-yl or haloalkyl;

R_3 is alkyl or haloalkyl;

R_4 represents a hydrogen or halogen atom; or a radical NR_5R_6, $S(O)_mR_7$, $C(O)R_7$, $C(O)O-R_7$, alkyl, haloalkyl or OR_8 or a radical $-N=C(R_9)(R_{10})$;

R_5 and R_6 independently represent a hydrogen atom or an alkyl, haloalkyl, C(O)alkyl, alkoxycarbonyl or $S(O)_rCF_3$ radical; or R_5 and R_6 may together form a divalent alkylene radical which may be interrupted by one or two divalent hetero atoms, such as oxygen or sulphur;

R_7 represents an alkyl or haloalkyl radical;

R_8 represents an alkyl or haloalkyl radical or a hydrogen atom;

R_9 represents an alkyl radical or a hydrogen atom;

R_{10} represents a phenyl or heteroaryl group optionally substituted with one or more halogen atoms or groups such as OH, -O-alkyl, -S-alkyl, cyano or alkyl;

R_{11} and R_{12} represent, independently of each other, a hydrogen or halogen atom, or optionally CN or NO_2;

R_{13} represents a halogen atom or a haloalkyl, haloalkoxy, $S(O)_qCF_3$ or SF_5 group;

m, n, q and r represent, independently of each other, an integer equal to 0, 1 or 2;

X represents a trivalent nitrogen atom or a radical $C-R_{12}$, the other three valency positions of the carbonatom forming part of the aromatic ring;

with the proviso that when R_1 is methyl, either R_3 is haloalkyl, R_4 is NH_2, R_{11} is Cl, R_{13} is CF_3 and X is N; or R_2 is 4,5-dicyanoimidazol-2-yl, R_4 is Cl, R_{11} is Cl, R_{13} is CF_3 and X is =C-Cl;

which method ensuring prevention and treating fleas and ticks to a high degree of efficacy and over a period exceeding 6 months against fleas and 3 months against ticks, the efficacy preferably being maintained over

several weeks even if the collar or external device is taken off or if there is a variation in the release of the compound (I) by the collar or external device.

22. Method according to claim 21, wherein the compound of formula (I) is such that:

R_1 is CN or methyl;

R_2 is $S(O)_nR_3$;

R_3 is alkyl or haloalkyl;

R_4 represents a hydrogen or halogen atom; or a radical NR_5R_6, $S(O)_mR_7$, $C(O)R_7$, alkyl, haloalkyl or OR_8 or a radical $-N=C(R_9)(R_{10})$;

R_5 and R_6 independently represent a hydrogen atom or an alkyl, haloalkyl, C(O)alkyl or $S(O)_rCF_3$ radical; or R_5 and R_6 may together form a divalent alkylene radical which may be interrupted by one or two divalent hetero atoms, such as oxygen or sulphur;

R_7 represents an alkyl or haloalkyl radical;

R_8 represents an alkyl or haloalkyl radical or a hydrogen atom;

R_9 represents an alkyl radical or a hydrogen atom;

R_{10} represents a phenyl or heteroaryl group optionally substituted with one or more halogen atoms or groups such as OH, -O-alkyl, -S-alkyl, cyano or alkyl;

R_{11} and R_{12} represent, independently of each other, a hydrogen or halogen atom;

R_{13} represents a halogen atom or a haloalkyl, haloalkoxy, $S(O)_qCF_3$ or SF_5 group;

m, n, q and r represent, independently of each other, an integer equal to 0, 1 or 2;

X represents a trivalent nitrogen atom or a radical $C-R_{12}$, the other three valency positions of the carbon atom forming part of the aromatic ring;

with the proviso that when R_1 is methyl, then R_3 is

haloalkyl, R_4 is NH_2, R_{11} is Cl, R_{13} is CF_3 and X is N.

23. Method according to claim 22, wherein the compound of formula (I) is such that R_1 is CN.

24. Method according to claim 22, wherein the compound of formula (I) is such that R_{13} is haloalkyl.

25. Method according to claim 22, wherein the compound of formula (I) is such that R_{13} is CF_3.

26. Method according to claims 22, wherein the compound of formula (I) is such that R_2 is $S(O)_nR_3$.

27. Method according to claim 26, wherein n = 1 and R_3 is chosen among the group consisting of CF_3, methyl, ethyl.

28. Method according to claim 26, wherein n = 0 and R_3 is CF_3.

29. Method according to claim 22, wherein the compound of formula (I) is such that X is C-R_{12}, R_{12} being a halogen atom.

30. Method according to claim 22, wherein the compound of formula (I) is such that R_1 is CN, R_3 is haloalkyl, R_4 is NH_2, R_{11} and R_{12} are, independently of each other, a halogen atom, and/or R_{13} is haloalkyl.

31. Method according to claim 22, wherein the compound of formula (I) is chosen among the group consisting of compound A:

1-[2,6-$Cl_2$4-CF_3phenyl]3-CN4-[SO-CF_3]5-NH_2pyrazole

~~and its derivatives~~ with n=0 and R_3 is CF_3, and n=1 and R_3 is ethyl.

32. Method according to claim 22, wherein the compound of formula (I) is present in a ~~proportion~~ concentration of from 1 to 15% by weight.

~~33.~~ 10 Method according to claim ~~22~~ 21, wherein the compound ~~of formula (I)~~ is present in a ~~proportion~~ concentration of from 1.25 to 10% by weight.

~~34~~. Method according to claim ~~22~~, wherein the compound ~~of formula (I)~~ is present in a ~~proportion~~ of from 2 to 6% by weight.

~~35~~. Method according to claim ~~22~~, wherein the compound ~~of formula (I)~~ is present in a ~~proportion~~ of from 2.5 to 5% by weight.

~~36~~. Method according to claim ~~31~~, wherein the compound ~~of formula (I)~~ is present in a ~~proportion~~ of from 1.25 to 10%.

~~37~~. Method according to claim ~~31~~, wherein the compound ~~of formula (I)~~ is present in a ~~proportion~~ of from 2 to 6% by weight.

~~38~~. Method according to claim ~~31~~, wherein the compound ~~of formula (I)~~ is present in a ~~proportion~~ of from 2.5 to 5% by weight.

~~39~~. Method according to claim 31, wherein the efficacy is greater than 95% against fleas.

~~40~~. Method according to claim ~~31~~, wherein the efficacy is greater than 98% or 99% against fleas.

41. Method according to claim 31, wherein the efficacy is greater than 80% against ticks.

~~42~~. Method according to claim ~~31~~, wherein the efficacy is greater than 90% against ticks.

~~43~~. Method according to claim ~~31~~, wherein the ~~long-lasting~~ efficacy is longer than or equal to 12 months against fleas.

~~44~~. Method according to claim ~~31~~, wherein the ~~long-lasting~~ efficacy is longer than or equal to 18 months against fleas.

~~45~~. Method according to claim ~~31~~, wherein the ~~long-lasting~~ efficacy is longer than or equal to 12 months against ticks.

~~46~~. Method according to claim ~~31~~, wherein the ~~long-~~

~~lasting~~ efficacy is longer than or equal to 15 months against ticks.

~~47~~ 41. Method according to claim ~~31~~, wherein the efficacy is maintained when the ~~collar or~~ external device is taken off or lost, over a period ranging from 2 to 3 months against fleas and from 1 to 2 months against ticks.